

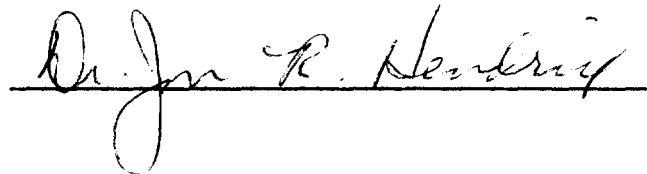
The Value of Internships in Career Decision Making--
An Experience in Genetic Counseling

An Honors Thesis (ID 499)

by

Lorraine K. Wean

Thesis Director

A handwritten signature in cursive script, reading "Dr. J. R. Hendrix", is written over a horizontal line.

Ball State University

Muncie, Indiana

May, 1985

Spring, 1985

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Introduction

Upon graduation from Ball State, I will enter the Indiana University School of Medicine to begin work on my M.D. degree. In addition to attending medical school, I will also be marrying a man who has chosen a career as an architect. My fiancé and I have established long-range goals for ourselves, both as individuals and as a couple; and, it is important to me that I find a medical specialty that fits into these plans. My desire is to specialize in a medical field that enables me to combine a home, a family, and a career. This desire is not a new one; many women physicians have voiced this same desire in the past (Richards 1983).

As a woman entering the field of medicine, I have the added worry of overcoming conventional stereotypes and prejudices; and, it is important to me that the specialty I choose is one in which I feel confident and secure. When choosing a specialty, female physicians have been shown to be more influenced by the length of the residency, their spouse, and working hours than their male counterparts (Ferrier, Woodward 1982). One study found that many women doctors would like to work less than 40 hours a week (O'Connell, Beighton 1979). It is also important to me that I find a specialty that would permit me to take time off to have

children; and I, like many women physicians, do expect to have career interruptions (O'Connell, Beighton 1979).

Since most physicians today choose to specialize in a particular area of medicine, I have been thinking a lot about what specialty interested me. As a Biology major with a concentration in Genetics, I have taken many genetics classes; and the area of Human Genetics particularly interests me. Because of this interest, I am considering a career as a Clinical Geneticist and Genetic Counselor. Since residencies are not available to physicians in Genetic Counseling, I think that it is very important to learn more about the occupation before I enter medical school. Not only do I want to learn more about what a counselor does, but I am also concerned about how the career would fit into my life plans.

An internship experience is an important aspect in deciding on a career. Unfortunately, in the medical field, clinical experiences in specialty areas are not planned to begin until the junior year of medical school. Studies have shown that a career specialty choice is more stable as the medical student gains more and more clinical experiences. Statistics showing this trend are shown in Table 1.

TABLE 1

CAREER SPECIALTY CHOICE STABILITY

Specialty Decision Made		Percent Remaining in the Specialty
*	Senior in College	3
**	1 st year--Medical School	39
***	2 nd year--Medical School	56.8
****	Medical Resident	86.4
<hr/>		
*	(Czinkota, Johnston 1983)	
**	(Markert 1983)	
***	(Glasser, Sarnowski, Sheth 1982)	
****	(Glasser, Sarnowski, Sheth 1982)	

Officials at the McGill University School of Medicine found that a program of early specialization during the senior year of medical school, replacing the traditional year of various clinical rotations, was unsuccessful in helping the students make early specialty choices (Dauphinee, Patal 1983). These statistics and studies verify the importance of the clinical experience when choosing a career.

Methods

It was my good fortune that Dr. Jon Hendrix, my thesis director, was able to arrange a week-long clinical internship for me during Spring Quarter, 1985 with Dr. Patricia Bader, a pediatrician and genetic counselor in Fort Wayne, Indiana. I also contacted Dr. Glenn Bingle, a genetic counselor at Community Hospital in Indianapolis, to see if I could spend a week during Spring Quarter of 1985 observing his practice. Dr. Bingle told me that his counseling was done primarily through the Medical Genetics Clinic at Riley Hospital for Children at the Indiana University School of Medicine. He invited me to go to the clinic with him for his next counseling session.

Before the internships, I developed a list of goals for myself and a set of questions that I had about genetic counseling. I later ranked the goals and identified personal strengths and weaknesses that could surface if I were to choose a career in genetic counseling. These goals, strengths, and weaknesses are shown in the following list.

1. To continue to develop my Christian faith

strengths)

--I think a strong faith is a must for success in life

--I rely upon my Christian faith for strength and support in good times and bad

weaknesses)

--continuing to develop requires effort and giving up my personal time

--it is often easy to forget about growing in a faith when things are going very well

2. To be content and satisfied with my life

strengths)

--I have chosen a partner, a career, and goals that I think
will please and satisfy me

--I hope to provide a stable and loving home for my family
which will make me feel good about myself and my life

weaknesses)

--I have been known to strive for higher positions, etc, for
the prestige rather than for my own happiness

--I can be pushed into situations and positions out of obliga-
tion that may not be what would make me happy

3. To have a fulfilling and strong marriage

strengths)

--I love, trust, and respect Dave; and I believe that he feels
the same about me

--I am willing to devote myself to making our marriage a
success

--I believe that Dave and I are strong enough to withstand
problems

weaknesses)

--I can be stubborn, selfish, and independent at times

--I may have a tendency to be more concerned about my career
at critical times

4. To have a family

strengths)

--both Dave and I want children

--I can be a good mother, and Dave and I can provide a good
environment for children

weaknesses)

--having a family is a life-long commitment

--as a parent, I will have to be totally unselfish and dedicated

--it will be hard to balance time between family and the needs
of my patients

5. To have a career

strengths)

--I am dedicated, strong, and hard working

--I want to be a physician

weaknesses)

--I am hard on myself and sometimes lack self-confidence

--a career will be very demanding, especially medical school
and a residency; and at times I will be tired, grumpy, and
disgusted

6. To be able to budget my time between myself, my family, and my career

strengths)

--I feel that I have been successful in time management during
college

--I will try to be flexible and aware of all commitments when
budgeting my time

weaknesses)

--I am likely to ignore my personal needs so I can spend more
time on my family and career

--I am hard on myself and will probably feel that I am often
neglecting someone or something

--I may feel that others are putting too much pressure on me,
and I may blame them for my time budgeting problems

7. To feel successful in my varying roles as a wife, mother, and doctor strengths)

--if I am happy, then I feel successful

--I think I am sensitive and able to change from role to role weaknesses)

--little things can make me feel like a failure

--I tend to blame myself when things go wrong

8. To feel that I am helping others strengths)

--I like to be with people, and I hope to help them by doing something to better their lives

--I feel that I am a caring and giving person

weaknesses)

--I need to be more open to all types of people

--I tend to think of money as the only way to help people

9. To feel secure in my career strengths)

--I want to be very good at what I do

--I am willing to try extra hard to prove myself and my abilities

--I will do my very best in medical school so as to have a good record when I apply for future positions

weaknesses)

--as a woman, I may have trouble being accepted; and, therefore, I may not feel really secure in my career

--I hope to eventually hold a position in administration, an area that has yet to accept women in its positions

10. To be financially secure

strengths)

--I think of myself as thrifty and budget-minded

--I realize the importance of saving for the future

weaknesses)

--I do not know how I will react to having money to spend

--I feel that I can too easily be driven by a desire for material goods, especially if it is something I have wanted for a long time

11. To become more involved in the Catholic Church

strengths)

--the Church is a community, and I would like to become more involved as a service to my church and to God

--I like to meet new people, and the Church is a good place to meet people with similar interests

weaknesses)

--involvement in the Church can very easily be pushed aside for other commitments

--I think that I can grow in my faith without becoming really involved in church activities other than attending Mass

Results and Conclusions

My experiences with Dr. Bader were especially helpful to me. As a woman physician, wife, and mother, Dr. Bader has an insight into my fears, thoughts, and concerns. Her openness and honesty in answering my questions has truly helped me in preparing myself for a career as a doctor. As a genetic counselor, Dr. Bader is knowledgeable, caring, concerned, and talented. I greatly admire Dr. Bader and her well-run community based practice.

Dr. Bingle is currently serving as the Director of Medical Education at Community Hospital and has very little time for counseling. Although he did invite me to attend a Friday clinic, he was not very willing to answer my questions. My main contact was with a Family Practice resident, who actually did most of the counseling, and a senior medical student who was interested in Pediatrics.

My questions about genetic counseling which were prepared prior to my internships, along with my answers and observations follow. My personal conversations, primarily with Dr. Bader, helped to answer many of my questions.

1. Is there time for a family and a career?

Time budgeting is a must--but you must always remember to be flexible. Demands on your time will vary from person to person from week to week.

2. Is the career a fulfilling one?

Dr. Bader is very happy in her position and she is helping many people both through counseling and research in her clinic.

3. Do you feel that you are using your medical training to its fullest?

Dr. Bader suggested to me that I do my residency in another field, such as Pediatrics or Family Practice, so I can get "a taste of real medicine" before settling into genetic counseling.

4. Do you feel financially stable?

Counseling does not pay as well as some medical specialties, but careful planning can provide financial security.

5. How much time did you spend in extra training to be a geneticist?

Dr. Bader spent part of her Pediatrics residency with the Department of Medical Genetics, and she later received her Masters Degree in Medical Genetics from Indiana University. Dr. Bingle has his Ph.D. in Medical Genetics, which he got before going to medical school.

6. How has your spouse adjusted to being married to a physician?

It can be very difficult for a man to adjust to his wife having a demanding career. He should be willing to help with both the house and the children if necessary. It is also very important for a wife to take an active interest in her husband's career.

7. How have your children adjusted to having a parent who is a doctor?

Quality time with your children is important, as is constant love and support. Even a working mother is able to give her children love and support.

8. What bothers you most about being a physician?

Many people do not understand the time commitment that a physician must make to his or her career, and it is even harder for many to comprehend why a woman would want to enter or be a part of a "man's world".

9. What have you gained from your career?

Confidence, fulfillment, and a sense of achievement.

10. What have you had to give up because of your career?

You miss many of the fun extras of your children's lives--you cannot be a room mother, Brownie leader, etc. You may not be what you visualize as the "ideal mother", but you can still be the "ideal mother" to your children.

11. How are you protected in the case of a misdiagnosis?

Dr. Bader has malpractice insurance that protects her from lawsuits in the case of a misdiagnosis.

12. Do you have people working under you?

Dr. Bader has her own laboratory for culturing and analysis, and there are three lab technicians working under her. Dr. Bingle does not have his own laboratory facilities, but he does have his own secretary.

13. How would you better or change the role of a genetic counselor?

More people need to be educated on the presence of genetic counselors and the services they provide.

14. How do you keep from expressing your personal feelings and influencing a couple's decision?

You must try to always present the facts and options only without personal interjections and opinions.

15. How do you personally deal with a couple's decision that is in conflict with your own beliefs?

You must accept a couple's decision and remember that although you do not personally agree with their decision, it is their choice and what they feel is best for them.

Brief case studies and descriptions of my clinical experiences follow:

1. 20 year old male
mentally retarded--no previous genetic workup
physical examination performed and measurements taken
possible Fragile X Syndrome
2. 39 year old female
in her sixth pregnancy--three children, two miscarriages
mother will be 39 at baby's birth
requesting ultrasound and amniocentesis for maternal age
two tries needed to get a sample of amniotic fluid--blood tinged
fluid due to possible puncture of a placental blood vessel
3. 40 year old female
in her third pregnancy--one child, one miscarriage
mother will be 41 at baby's birth
requesting ultrasound and amniocentesis for maternal age
no amniocentesis was performed because the ultrasound showed the
fetus to only be $13\frac{1}{2}$ weeks old
amniocentesis rescheduled
4. 2 year old female
probable Myotonic Dystrophy
originally seen in Intensive Care Nursery at birth
expressionless face, equinovarus foot deformity, slow learner, low
set ears, epicanthal folds, short fifth finger
recommendation made for special pre-school or play group
5. 6 year old female
Marfans Syndrome
first seen in Bluffton at birth
long thin fingers, toes, and feet; barrel-shaped sternum; major
heart defects; scoliosis
will be seen for heart catheter at Riley Hospital for Children--told
of very high risk in heart surgery
told of Marfans Clinic at Johns Hopkins

6. 40 year old female
in her third pregnancy--two children
mother will be 40 at baby's birth
requesting ultrasound and amniocentesis for maternal age
successful amniotic fluid sample with first attempt
7. 42 year old female
Assisted with ultrasound and chorion villus biopsy
8. 39 year old female
referral for possible Turners Syndrome
family history taken and physical examination performed
normal puberty--menstruation, pubic hair, breast development, and
one normal pregnancy
not thought to be Turners--possibly a mosaic/45X:46XX
9. 28 year old female
autopsy of D&C specimen following spontaneous abortion
ninth miscarriage
no embryo found, just membrane
tissue cultures set up for later chromosomal analysis
10. 18 year old female
Assisted with ultrasound and chorion villus biopsy
11. married couple
genetic consult after they were unable to conceive--possible
genetic cause of infertility
husband had been exposed to Agent Orange
no chromosomal problems found that could prevent conception
12. married couple
counseling after having lost an anencephalic child
are planning to have another child
couple had done research and reading on anencephaly and the
reccurance risks

13. 8 year old male

developmentally delayed, slow learner, autistic-like trances

uncooperative during physical examination

poor speech--at times worse than at other times--difficult to understand his words

quite fascinated with strings--would sit and twirl them for long periods of time

neurological tests ordered to evaluate seizures

Cases 1-11 were seen with Dr. Bader in Fort Wayne, and cases 12 and 13 were seen at the Riley Genetics Clinic with Dr. Bingle. Tabulation of my experiences during my clinical internships shows that I observed: five ultrasounds, four genetic consults, three genetic workups, two amniocenteses, two chorion villus biopsies, and one autopsy of pregnancy wastage.

After having compared my personal goals, strengths, and weaknesses with Dr. Bader's comments on genetic counseling, I am seriously considering genetic counseling as my medical specialty. I was very impressed by Dr. Bader's control and authority in her community clinic and her flexibility in her practice. I think that I would be able to take time off to have children, and the working hours in such a practice can really be as long or as short as you want them to be. My main concern with a genetic counseling practice is, as Dr. Bader mentioned, the lack of contact with "real medicine". I plan to possibly work part-time in a hospital Emergency Room, and I hope that this will soothe the need to have contact with "real medicine".

After my clinical internships and personal evaluation, I feel that I would be very happy and fulfilled in a career as a physician and genetic counselor in a community based clinic. My experiences have shown me a great deal about working with and helping others, and I think that genetic counseling would present me with challenges and intellectually stimulating situations. I am now planning to do a residency in Family Practice, obtain my Masters Degree in Medical Genetics, and establish a community based genetic counseling center.

Recommendation

Based upon my experiences in my clinical internships and their usefulness in helping me choose a career specialty, I highly recommend that internships be made available to more college students in their chosen career fields.

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As a result of my clinical internship, I am co-author of an article being submitted for publication to the Journal of Obstetrics and Gynecology.

References

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APPENDIX 1

DEPARTMENT OF MEDICAL GENETICS

Indiana University Medical School

FULL-TIME FACULTY:

David Bixler, D.D.S., Ph.D.	Embryology, Teratology, Dysmorphology, Clinical Genetics
Ira K. Brandt, M.D.	Metabolic Diseases
Joe C. Christian, M.D., Ph.D.	Twin Studies, Cardiovascular Genetics, Clinical Genetics
P.M. Conneally, Ph.D.	Population Genetics, Huntington Research Roster
David J. Goldstein, M.D., Ph.D.	Biochemical Genetics, Monoclonal Antibodies, Molecular Genetics, Clinical Genetics
Nyla A. Heerema, Ph.D.	Cytogenetics
M.E. Hodes, M.D., Ph.D.	Biochemical Genetics, Molecular Genetics, Clinical Genetics
Ke Won Kang, Ph.D.	Population Genetics, Quantitative Genetics
Robert C. Karn, Ph.D.	Biochemical Genetics, Protein Structure, Molecular Genetics
Catherine G. Palmer, Ph.D.	Cytogenetics
Terry E. Reed, Ph.D., M.P.H.	Dermatoglyphics, Epidemiology
Robert H. Schaible, Ph.D.	Comparative Medical Genetics
David D. Weaver, M.D.	Dysmorphology, Clinical Genetics, Prenatal Diagnosis
Pao-lo Yu, Ph.D.	Population Genetics, Biostatistics

ASSOCIATED FACULTY:

Ray Antley	Clinical Genetics, Genetic Counseling, Radiology
Pat Bader, M.D.	Clinical Genetics, Cytogenetics
Harvey Bender, Ph.D.	Developmental Genetics, Clinical Genetics
Glen Bingle, M.D., Ph.D.	Clinical Genetics, Medical Education
Marilyn Bull, M.D.	Birth Defects and Child Development
Merlyn Butler, M.D., Ph.D.	Clinical Genetics, Cytogenetics
John Gersting, Ph.D.	Computer Science
John Meaney, Ph.D.	Maternal and Child Health, Anthropometrics
James Norton, Ph.D.	Biostatistics
Lillie-Mae Padilla, M.D.	Prenatal Diagnosis
Richard Rose, Ph.D.	Behavioral Genetics
Jim Smurl, S.T.D.	Medical Ethicist
Rebecca S. Wappner, M.D.	Metabolic Diseases

NUMBER OF STUDENTS AND FELLOWS:	<u>1981</u>	<u>1982</u>	<u>1983</u>
Graduate Students	12		20
M.D., Ph.D. Students	4		4
Ph.D. Postdoctoral Fellows	5		4
M.D. Postdoctoral Fellows	1		3
D.M.D. Postdoctoral Fellows	1		1
NUMBER OF GENETIC CONSULTS PER YEAR:	213	211	222
NUMBER OF METABOLIC CONSULTS PER YEAR:	372		108
NUMBER OF CLINIC VISITS PER YEAR:			
Medical Genetics (weekly)	341	380	383
Growth Anomalies (once a month)	41	33	57
Metabolic (weekly)	364		332
Prenatal Diagnosis (weekly)	575	466	489
Out-Reach Clinics:			
South Bend (monthly)	87	114	132
Terre Haute (bi-monthly)	24		33
Muscatatuck (bi-monthly)	40	27	13
Evansville (bi-monthly)		7	20
The Medical Genetics Clinics have an attending Neurologist once monthly, and the Growth Anomalies Clinic is joint Genetics and Orthopedics.			
NUMBER OF CHROMOSOME ANALYSES:			
Leukocyte	469	579	651
Fibroblast	39	53	69
Bone Marrow	64	118	192
Amniotic Fluid Cells	442	612	695
Chorionic Villi (1984) - 42			
NUMBER OF α -FETOPROTEIN ACETYLCHOLINESTERASE:	359	606	687
NUMBER OF METABOLIC STUDIES:			
Urine	760		792
Organic Acids and Other Acids	312		404
Lysozomal Carrier Testing	111		70
Other Enzymatic Studies	41		47
NUMBER OF LIPID ANALYSES:		304	292
GENOTYPING:		2,634	1,573

Who Should Seek Genetic Counseling?

-An **expectant parent over 35** (regardless of how many previous successful births) . . .

-A couple having had a **previous miscarriage, stillbirth, or failure to conceive** . . .

-A family having had a **child with a birth defect** . . .

-An individual or couple identified through diagnostic testing as being **carriers of a disorder** . . .

-A family having a **relative with a birth defect or genetic disorder** . . .

-Members of an **ethnic group with a high risk** for a specific disorder . . .

What Is Genetic Counseling?

Genetic counseling provides individuals and families with information about actual or potential inherited defects or disorders. These disorders may be within the individual, his or her children, or other family members.

What Happens In Genetic Counseling?

-Medical and family histories are studied . . .

-A physical examination may be performed by a physician . . .

-Tests may be ordered . . .

-A summary conference is scheduled to synthesize all the pertinent information for the patient and family . . .

What Kinds of Tests May Be Ordered In A Genetic Evaluation?

Blood Tests. A peripheral blood study is appropriate when checking for normal chromosome makeup within the cells. This is recommended in infertility problems, children born with anomalies and adolescents who fail to mature at puberty.

Amniocentesis. This test is performed during the fifteenth to sixteenth week of pregnancy. Under ultrasound guidance, a needle is inserted through the abdominal wall into the uterus and amniotic fluid, which surrounds the developing fetus, is drawn out into a syringe. A local anesthetic is used and the test usually takes about an hour. The amniocentesis is appropriate when there is a **high risk pregnancy**. Any expectant mother who has a history of birth problems herself or in her family, who has had two or more miscarriages, or when either parent is over 35, should consider this test.

Along with chromosomal results, this test includes a check for alpha fetoprotein, which detects 95 percent of all spina bifida defects. Additional biochemical studies can be performed when it is appropriate.

Tissue Testing. Since a high proportion of miscarried fetuses or stillbirths have a chromosomal abnormality, we recommend testing tissue from a miscarriage or stillbirth to detect such problems. In addition, an assessment of the tissue is made to determine if other possible genetic syndromes or congenital anomalies may be responsible in the pregnancy loss.



INDIANA UNIVERSITY AT INDIANAPOLIS

School of Medicine
Department of Medical Genetics

Program of Study	<p>The department, an integral part of both the School of Medicine and the Graduate School of Indiana University, offers a program of study leading to the degree of Doctor of Philosophy in medical genetics. The Master of Science degree is also offered. The areas of study emphasized in the department are population genetics, cytogenetics, biochemical genetics, medical and dental genetics, and biometric principles as applied to the study of man. Research opportunities include population studies; human cytogenetics; clinical genetics; immunogenetics; molecular, biochemical, developmental, and behavioral genetics; protein differentiation and analysis; enzyme characterization; lipid and protein metabolism; and nucleic acids, including recombinant DNA.</p> <p>Students are encouraged to gain exposure to clinical genetics through participation in the weekly Medical Genetics Clinic. In consultation with the major professor and an advisory committee, each student selects other courses for their applicability to the student's individual needs and interests. Ninety credit hours are required for the Ph.D. degree. A maximum of 30 hours of graduate credit may be transferred toward the Ph.D.</p> <p>To maintain close faculty-student relationships, enrollment in the program is limited to a small number of students. This degree program prepares students for academic careers and for research positions in government, hospitals, medical schools, and industry.</p>
Research Facilities	<p>The department's facilities are located in the Riley Children's Hospital Research Wing at the Indiana University Medical Center. This area includes tissue culture and microscopy facilities; laboratories for biochemical research, cytogenetics, monoclonal antibody production, blood-grouping studies, and recombinant DNA studies; computer equipment for data analysis; and an extensive collection of family data, including information on hereditary disorders and genetic markers.</p>
Financial Aid	<p>Financial assistance is available to qualified students seeking the Ph.D. degree. Aid is awarded in the form of research and teaching assistantships. Students who serve as research or teaching assistants qualify for fee remission. A number of fellowships also are available. Students who receive such fellowships qualify for in-state fees.</p>
Cost of Study	<p>Tuition for 1984-85 is \$65.25 per credit for in-state students and \$180.25 per credit for out-of-state students.</p>
Cost of Living	<p>Limited on-campus living facilities are available for single students. Off-campus facilities are readily available at reasonable rates for students with transportation. The Housing Department of Indiana University-Purdue University at Indianapolis (1300 West Michigan Street, Indianapolis, Indiana 46223) can provide additional information on housing.</p>
Student Group	<p>The total student enrollment is 23,000. About 3,800 students are engaged in graduate study and 3,700 are enrolled in the medical, dental, and nursing schools. The Department of Medical Genetics has a total of 25 graduate and postdoctoral students.</p>
The Community	<p>Indianapolis, a city of more than 1 million residents, provides a metropolitan environment. Academic facilities of five colleges and universities are located in the city, and the main campuses of Indiana and Purdue universities are within an hour's drive of the Medical Center campus.</p> <p>The city's cultural activities include programs supported by the Indianapolis Museum of Art and the Indianapolis Symphony Orchestra. A diverse year-round program of theater, ballet, and popular entertainment is presented at Clowes Hall, Market Square Arena, and the Indianapolis Convention Center.</p>
The Medical Center	<p>The Indiana University Medical Center occupies 85 acres in the semicircle of White River and its adjacent parkways. It is a part of the complex of Indiana University-Purdue University at Indianapolis, which offers undergraduate and graduate training in engineering, business, nursing, social work, medicine, and dentistry and has extensive facilities for amateur athletics.</p> <p>The Medical Center facilities include separate buildings for the basic sciences, dentistry, public health, nursing, and administration and a Student Union Building with housing and recreational facilities. A complex of six hospitals (containing 310 pediatric and 1,522 adult beds) provides medical services comparable to those at other major university medical centers.</p>
Applying	<p>Applicants may obtain forms by writing to Dr. R. C. Karn at the address below. Applications should be submitted before February 15 if the student wishes to be considered for an assistantship for the fall semester; application before January 31 is encouraged.</p> <p>Applicants are expected to have had a basic course in genetics, mathematics through calculus, and at least two years of chemistry. Normally, a grade point average of at least 3.2 is required for admission, and some prior research experience is an advantage. Scores on the Graduate Record Examination, including the General Test and the Subject Test in biology, chemistry, or mathematics, must be available for review at the time of application. Therefore, it is suggested that the examination be taken no later than December.</p> <p>Individual faculty members other than Dr. Karn may also be contacted at the address given below.</p>
Correspondence and Information	<p>Dr. R. C. Karn Department of Medical Genetics Indiana University Medical Center 702 Barnhill Drive RR129 Indianapolis, Indiana 46223</p>

Indiana University at Indianapolis

THE FACULTY AND THEIR RESEARCH

David Bixler, Ph.D., 1956; D.D.S., 1959; Professor of Medical Genetics and Oral Facial Genetics, and Chairman, Oral Facial Genetics Department, School of Dentistry. Developmental genetics, including craniofacial dysmorphology, cleft lip and palate, and heritable disorders of teeth.

Ira K. Brandt, M.D., 1945; Professor of Pediatrics and Medical Genetics. Genetically determined disorders of metabolism.

Joe C. Christian, Ph.D., 1960; M.D., 1964; Professor and Chairman of Medical Genetics. Quantitative genetics of cardiovascular disease risk factors; twin studies; clinical genetics.

P. M. Conneally, Ph.D., 1962; Professor of Medical Genetics and Neurology. Population genetics; linkage analysis; genetic heterogeneity; genetic studies of Huntington's disease.

David J. Goldstein, M.D., 1973; Ph.D., 1975; Assistant Professor of Medical Genetics. Biochemical genetics, immunogenetics (monoclonal methodology); neurogenetics; clinical genetics.

Nyla A. Heerema, Ph.D., 1967; Instructor of Medical Genetics. Cytogenetics; cytogenetics of leukemias; clinical cytogenetics; prenatal diagnosis.

M. E. Hodes, M.D., 1947; Ph.D., 1955; Professor of Medical Genetics and Medicine. Molecular genetics; experimental oncology; clinical genetics.

Ke Won Kang, Ph.D., 1966; Associate Professor of Medical Genetics. Human quantitative genetics; computer applications in medical genetics; twin studies.

Robert C. Karn, Ph.D., 1972; Associate Professor of Medical Genetics. Biochemical genetics and protein polymorphisms.

F. John Meaney, Ph.D., 1977; Adjunct Assistant Professor of Medical Genetics. Human quantitative genetics; biological anthropology; twin studies.

C. G. Palmer, Ph.D., 1953; Professor of Medical Genetics. Cytogenetics; chromosome polymorphisms; clinical cytogenetics; prenatal diagnosis.

Terry E. Reed, Ph.D., 1971; M.P.H., 1982; Associate Professor of Medical Genetics. Dermatoglyphics; twin studies; epidemiology.

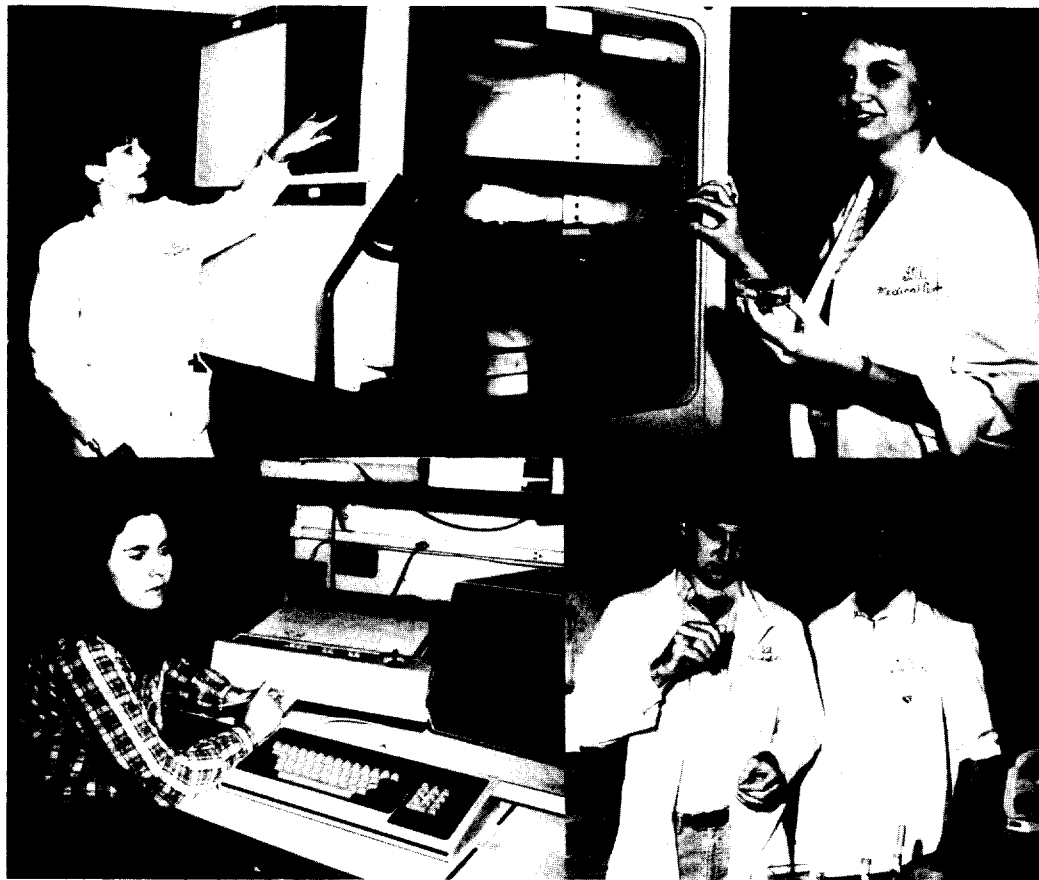
R. J. Rose, Ph.D., 1964; Professor of Psychology and Medical Genetics. Human behavior genetics; personality and psychopathology.

R. H. Schaible, Ph.D., 1963; Assistant Professor of Medical Genetics. Animal models of human genetic disorders.

James F. Smurl, S.T.D., 1963; Professor of Religious Studies and Adjunct Professor of Medical Genetics. Ethics in genetic counseling and social policies.

David D. Weaver, M.S., M.D., 1966; Associate Professor of Medical Genetics. Clinical genetics; dysmorphology; prenatal diagnosis; syndromology; birth defects.

Pao-Lo Yu, Ph.D., 1961; Professor of Medical Genetics. Quantitative genetics; genetic studies of salivary proteins; statistics in genetics; biostatistics.



Medical genetics students engaged in typical activities, clockwise from upper left: Sequencing DNA; tissue culture studies; preparation for chromosome analysis; linkage analysis by computer.